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BASED AUTOMATIC PERSONALITY RECOGNITION USED IN ASYNCHRONOUS VIDEO INTERVIEWS OF STRESS DETECTION USING FACE IMAGES AND FACIAL LANDMARK BY USING THE CONVOLUTION NEURAL NETWORK (CNN) ALGORITHM

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ABSTRACT

With the help of face photos and facial landmarks, we suggest a stress recognition algorithm in this work. A device for gathering the necessary data is needed along the event of stress detection utilising a natural or biological signal or thermal picture, thus being important area for research. To address this flaw, we put forth an algorithm that can identify a person's behaviour from still videos or photos taken using a normal camera, including creating in-depth neural network, uses facial identifications infused along benefiting that when someone is being stressed, their eye, mouth, and head movements differ along how they normally behave. Likewise, by identifying a candidate's behaviour during an online interview, we can determine whether or not they are qualified. The suggested algorithm recognises behaviour more accurately, according to experimental data.

KEYWORDS: ***C****++, Python, Java, Convolutional Neural Network (CNN),* ***Personality*** *Recognition, Open CV, HAAR Cascade and Mat Lab, Open CV, Espeak, Xming & Putty*

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1. INTRODUCTION

In many situations where more security or personal data about the person is needed, human emotion detection is used. We could need to set up a second layer of protection where, in addition to the face, the emotion is also detected. This can be considered as the second stage after face detection. A system is currently being developed to detect when a user is under stress and to provide feedback in the aim of reducing stress when under stress, as modern individuals experience tremendous levels of stress. Additionally, we suggested that the student's emotions be acknowledged and that the worried teacher receive an update. Focusing on knowing classes for students including time-table being shared amongst them.

In these investigations, characteristics from bio signals such the electrocardiogram, electro dermal activity, respiration, galvanic skin response, and heart rate variability were extracted and used to express stress. Furthermore, a lot of them made use of traditional classifiers like Support Vector Machine, Linear Discriminant Analysis, Adaboost, and K-Nearest Neighbor [1].

Along the vicinity of recognising stresses, numerous methods thru bio-signals being evaluated, though a measure and along bio-signalling, an end-user may experience rejections due to tools applied in measuring bio-signalling thus being rooted along the body. Thus numerous observations along stress-recognition thru thermal imaging were done, thus even a demerit along complications in recognizing stress simply along everyday life due to un recognisable without any tools of thermal imaging, parallelly in the vent of stress-recognition observations thru common imaging, popular evaluations adapted being considerably featured as simple.

In this article, we provide a technique for identifying stress that involves extracting high-dimensional features from face photos taken with a regular camera. Additionally, we use the placement of face landmarks that significantly vary when under stress in order to learn more effective features.

2. RELATED WORK

Physiological parameter evaluation, bodily fluid measurement, and the paper method (self-report) are some of the behaviour analysis techniques now in use. In the paper approach, individuals are given a multiple-choice questionnaire to complete, and each response is assigned a specific score. After the respondent completes the questionnaire, the results of each choice will be added up to produce a final score that represents the individual's level of conduct. For the identification of the stress hormone, Cortical, body fluid tests such as blood or saliva are performed. These two approaches are ineffective for tracking stress over time. Monitoring and analysing physiological data can give one a useful understanding of their health.

Behavior Recognition using Bio-Signals

Because they display the body's most sensitive alterations and enable the identification of changes in the body that are not indicated by face and behaviour, bio-signals were used in early research on stress recognition. In these investigations, characteristics from bio-signals such the electrocardiogram, electro dermal activity, respiration, galvanic skin response, and heart rate variability were extracted and used to express stress. And a lot of them made use of traditional classifiers like K-Nearest Neighbor, AdaBoost, Support Vector Machine, and linear discriminant analysis.

Behavior Recognition Using

Thermal picture many studies have been done to detect the change by using the thermal imaging to detect the change because when a person is stressed, the blood flow and temperature of the face increase. This research used a variety of techniques to identify stress, including directly extracting characteristics from thermal pictures and extracting features like respiration rate, blink frequency, skin temperature, and blood flow from thermal images.

Behavior Recognition using General Image

Eye, lip, and head movements change when a person is stressed compared to normal circumstances, and research on stress recognition using common imagery is also being done. These research employed a variety of techniques to identify stress, including the extraction of hand-crafted features from the nose, mouth, and eye regions as well as the use of eye size, lip motions, and head movements as features.

3. LITERATURE REVIEW

Human Attitude-Recognition Applications Based on Facial Feature through Face Detection

Author: Ardinintya Setyadi Diva et.al,

Published in: 2015 International Electronics Symposium (IES)

Abstract

Human-psychology, explored along 4 basic personalities like sanguine, choleric, melancholic, and phlegmatic. Basic mode of knowing human fundamental personality is by testing, thus being Grapho test (handwriting test). Current study its being executed on detecting human fundamental personality thru collective featured faces: the eyes, lips, and nose (prior to test), thus got thru received images of faces, gap amongst the corners of the eyes, ratios amongst mouth width and nose, ratios of width amongst eyes, lip thickness being extracting features, thru ANN:artificial neural networks (back-propagation), also relaying on extracting such features, the fundamental personality being identified. Considering practical findings, system detects human fundamental personality along similar input imaging data along training average ratios 85.5%. The identification findings various input imaging data along training being weighed as 42.5% average, situations demands thru identification of personality along choleric, phlegmatic reads lessened about 50% ratios.

ADVANTAGE

- They have implemented 2 types of testing, one on the same photo and another on the different photo.

DISADVANTAGE

- Testing accuracy being minimally about 50% along few features on a limited occasions

Sentiment Classification and Personality Detection via Galvanic Skin Response Based on Deep Learning Models

Author: Tao Hong; Xiao Sun; Fang Tian; Fuji Ren

Published In: 2019 5th International Conference on Big Data Computing and Communications (BIGCOM)

Abstract

Sentiment and personality have a significant influence on how we think, create, and make decisions in our daily lives. Many methods have been put forth to automatically detect users' sentiment in speech and image. For some circumstances, such as interviews and polygraphs, being able to accurately forecast a person's emotions and personality traits can be helpful. In this work, several models, such as Joint Learning Model of Convolutional Neural Network and memory along long-Short-Term, also spatiotemporal hybrid models were projected to know automatically about galvanic skin response (GSR), also video clips rating against similar to sentiments recognition, personality detection facts, matching along projected models, also state-of-the-art models along similar works. The practical findings presented against predominant findings along sentiment recognition, also personality detection being benefitted along precision, recall, and F1 score.

ADVANTAGE

- Matched against other similar trials adapting Galvanic Skin response (GSR) signal along emotional categorisation of personality detection, practical findings are enhanced.

DISADVANTAGE

The categorisation along surprise, happiness being a tough fact.

Study on Determining the Big-Five Personality Traits of an Individual Based On Facial Expressions

Author: Mihai Gavrilescu

Published In: 2015 E-Health and Bioengineering Conference (EHB)

Abstract

According to previous studies, there is an increasing demand for information about people's personalities and behaviours in areas like career development and counselling, individualised health care, mental disorder diagnosis, and the early detection of physical illnesses with personality shift symptoms. The Big-Five personality types can currently only be identified by completing a questionnaire, which takes an unreasonable amount of time and cannot be used frequently. Our research intends to develop a cutting-edge, non-invasive method for identifying the Big-Five personality traits based on facial features collected with the help of the Facial Action Coding System. The findings indicate a relationship between a person's personality qualities and the FACS action units present in face features at their highest intensities. Additionally, compared to the required for completing a questionnaire, the system developed delivers over 75% accuracy of the prediction openness to experience, as well as trait anxiety and extraversion, and it is practical, giving findings in less than 3 minutes.

ADVANTAGES

Approximate time taken by the system to provide results was roughly 45 sec for video sequences with included emotions.

DISADVANTAGE

Unable to accurately determine conscientiousness and agreeableness which are part of personality traits.

4. IMPLEMENTATION

I. Proposed algorithm

in this part we provide an approach to enhance the performance of stress recognition overall structure in the suggested approach stress recognition begins with face picture and facial landmark detection in order to detect faces more correctly we employ a deep learning technique that uses three networks sequentially we employ a custom approach that employs a cascade type of extracted features along sudden-fem also, the regression tree classifier along recognising face identifications graphic below visualises collective frameworks flowchart.

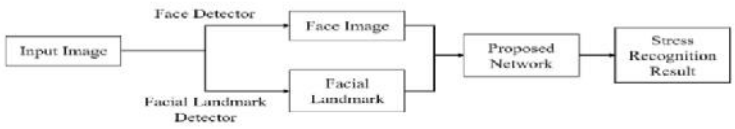

Figure 1.

Along the estimated network, the facial imaging, identified previously is input to output stress recognition findings. The structure of the estimated network is visualised along fig.

Progressed network, adapted shortcut assigning, bottleneck architecture to enhance neural network structure. Through this shortcut assigning to the neural network structure supported along numerous layers, encourages in simplifying learning methods, alos explains learning directions. Making it successful in simply enhancing the in-depth neural network, also to progress accuracy along progressed depth. Thru implying bottleneck architecture, the quantum of internal factors being lessened along elevating quantum of feature maps, which elevates functionality, declines quantum of computation.

II.Input/Output Design

System design shows the overall design of system. In this section we discuss in detail the design aspects of the system:

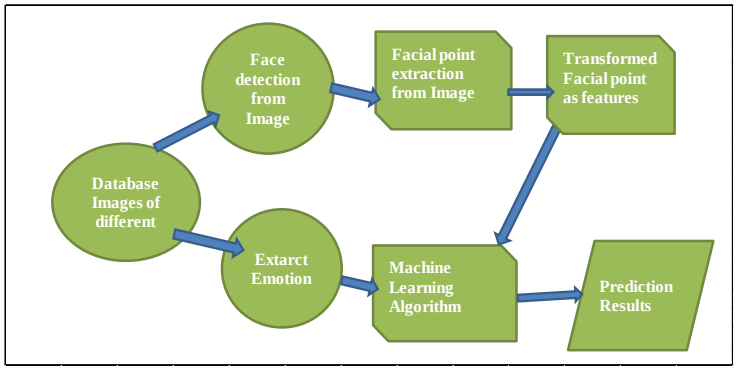

Figure 2.

Image Capture

Static photos or image sequences are utilised to detect face expressions. A camera can record pictures of faces. Face recognition

In order to identify facial images, face detection is helpful. Face detection is done in the training dataset using the Opencv implementation of the Haar classifier Voila-Jones face detector. The value of a feature with a haar-like structure is the difference in the sum of the pixel values in the black and white regions, and it encodes the variation in average intensity in different regions of the image [6]. Image preparation

Noise is eliminated during image pre-processing, and brightness and pixel position variations are normalised.

- Color Normalization \s
- Histogram Normalization

Extraction of Features

The choice of the feature vector in a pattern classification issue is crucial. After pre-processing, the facial image is used to extract the key features. Scale, attitude, translation, and fluctuations in illumination level are some of the fundamental issues with image classification [6]. Classification Classification is used to reduce the high dimensionality of data that was obtained using the feature extraction method. Convolutional neural network algorithm will be used to classify objects, and features should take distinct values for objects belonging to different classes.

III. Data Flow Diagram

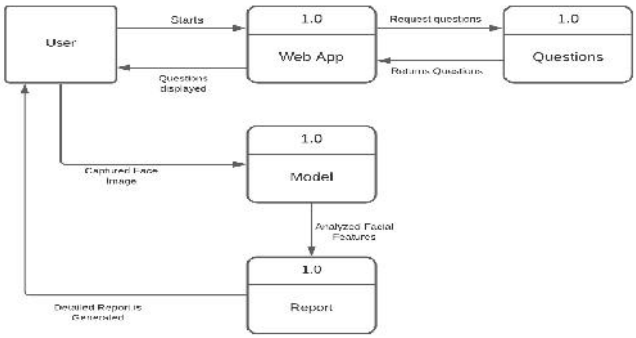

Figure 3.

Sequence Diagram

In a sequence diagram, object connections are arranged in temporal order. It illustrates the classes and objects involved in the situation as well as the message flow that must occur for the objects to function as intended. Sequence diagrams and use case realisations are frequently connected in the logical view of the system under development. Other names for sequence diagrams are event diagrams and event scenarios.

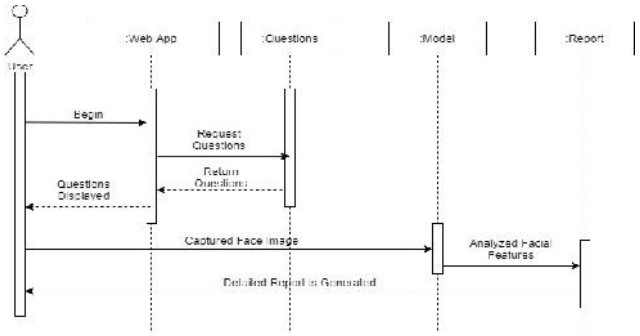

Figure 4.

Activity Diagram

The system's dynamic features are described in the activity diagram, a UML diagram. In actuality, a flowchart controls how each event proceeds. The system's operation can be characterised as the event. The control flow must be followed between tasks.

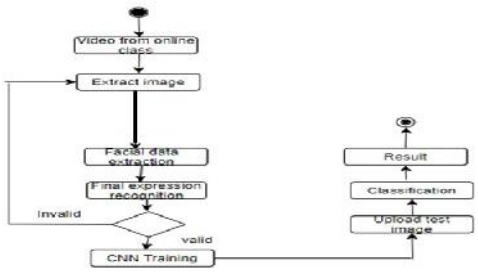

Figure 5.

5. REQUIRMENTS

A. Functional requirements

A system's functional requirements specify what the system should be able to achieve. These specifications are determined by the kind of software being created and the intended audience.

- Creating Web based functions for Trait analysis.
- Designing/ formulating questions for analysis, visualising to user sequentially.
- Capturing facial imaging thru answering to questions.
- Analyzing traits along imaging.
- Visualising clarified assessment report.

B. Non-Functional Essentialities

Nonfunctional essentialities are those that do not directly relate to the system's performance of the given function. They might be connected to emergent system attributes including dependability, response time, and store occupancy.

C. HARDWARE AND SOFTWARE NECESSITIES HARDWARE

System	intel i3/i5 2.4 GHz
Hard Disk	500 GB
Ram	4/8 GB SOFTWARE
Operating system	Windows XP / Above
Software Tool	Open CV Python
Coding Language	Python

Figure 6.

6. RESULTS

Considerable objectives along this work being designing an efficient, accurate algorithm, thus identifies attitude analysis along the interview aspirants, attitude identification of aspirants. Supports aspirants who are unable to participate in interview on company vicinity. Benefits along saving time, man power of interviewer. Along facial identification to function capably, its necessary to avail an imaging input that should not blur/printed. Here adapted algorithm along facial identification, feature extractions, system generates automatic questionnaires against aspirants available along computer, also identify the personality of aspirant along the mode of answering the questions. Feedback being generated automatically, thus received of interviewers mail box. Functional real time analysis, probability data representations.

7. CONCLUSION

We suggest a stress recognition system that makes use of face landmarks and face photos. The experiment's findings showed that employing face landmarks enhanced the performance of stress recognition. Because they make it easier for you to comprehend eye, mouth, and head movements, facial landmarks are better at helping you detect stress. We also discovered that when employing a grey facial image of the right size, performance was enhanced by more accurately identifying stress-related information.

Future studies aim to enhance the performance of stress recognition by utilising time-axis information on head, mouth, and eye motion.

REFERENCES

1. *Sriramprakash, S., Prasanna, V. D., & Murthy, O. R. (2017). Stress detection in working people. Procedia computer science, 115, 359-366.*
2. *Mohd, M. N. H., Kashima, M., Sato, K., & Watanabe, M. (2015). Mental stress recognition based on non-invasive and non-contact measurement from stereo thermal and visible sensors. International Journal of Affective Engineering, 14(1), 9-17.*
3. *Prasetio, B. H., Tamura, H., &Tanno, K. (2018, May). Support Vector Slant Binary Tree Architecture for Facial Stress Recognition Based on Gabor and HOG Feature. In 2018 International Workshop on Big Data and Information Security (IWBIS) (pp. 63-68).IEEE.*
4. *Zhang, K., Zhang, Z., Li, Z., &Qiao, Y. (2016). Joint face detection and alignment using multitask cascaded convolutional networks. IEEE Signal Processing Letters, 23(10), 1499-1503.*
5. *Kazemi, V., & Sullivan, J. (2014). One millisecond face alignment with an ensemble of regression trees. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 1867-1874).*
6. *He, K., Zhang, X., Ren, S., & Sun, J. (2016). Deep residual learning for image recognition. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 770-778).*
7. *Nishanth, N., And Kamal Khumar Ls. "An Automatic Personality Recognition System Using Time Distributed Cnn." International Journal of Computer Science Engineering and Information Technology Research (IJCSEITR) ISSN (P): 2249–6831; ISSN (E): 2249–7943 Vol. 12, Issue 1, Jun 2022, 1-12*